Tracking progress two-thirds on the way to 2015:

Will the Millennium Development Goal for Child Survival be met in South Africa?

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Abstract

Background: The Millennium Development Goals (MDGs), adopted by most nations in 2000, set specific targets for poverty reduction, addressing topics like hunger, education and health. The fourth MDG aims to reduce child mortality by two-thirds between 1990 and 2015. South Africa is one of 12 countries where child mortality has increased since the baseline in 1990. **Aims:** To investigate the reasons for increased child mortality in South Africa, and propose an answer to whether the country can reach the fourth MDG. **Methods:** The literature in this paper draws on the Lancet Series on Health in South Africa, South Africa's MDG Country Reports, the United Nations MDG Report 2010 and relevant articles from a non-systematic search in PubMed. **Results:** HIV/AIDS, neonatal causes and childhood infections are three major killers of children under five in South Africa. Despite fairly high coverage of health services to pregnant women and children, there are important gaps in coverage and quality of care, with high burden of mother-to-child transmission of HIV, complications of birth and suboptimal postnatal care. Inequities are resulting in a strained public health sector and disparities in social determinants for health. Interventions of improved intrapartum care and care for newborns, together with a scale-up of prevention-of-mother-to-child-transmission of HIV counts for most of the potential lives saved. **Conclusions:** The vast majority of under-five deaths in South Africa could be avoided if coverage and quality of existing interventions was improved. With commitment to priority actions, South Africa has the potential to achieve the fourth MDG.

Introduction

The Millennium Declaration in 2000 was a milestone in international development and cooperation, setting the framework for development activities in 189 countries. The unprecedented commitment to the Millennium Development Goals (MDGs) is not only evident in government and development institutions, but also private sector and civil society. The eight MDGs represent development aspirations of the world, encompassing human values and rights such as health, education and decent living conditions, with specific targets to be met by 2015. Progress has been made towards the goals, but the world as a whole is not on track to fulfil the commitments. The fourth MDG aims to reduce child mortality. Each year more than 8 million children worldwide under the age of five die, most of them from preventable causes[1]. Despite progress, 62 countries are not on track towards reaching the fourth MDG of reducing by two-thirds between 1990 and 2015, the under-five mortality rate (U5MR)[2]. South Africa is one of only 12 countries in which mortality rates for children have increased since the baseline in 1990[3].

With a background from development studies before starting medical school, I found the topic on child health in relation to the MDGs interesting as I find paediatrics of special interest and as this development project is unique in its kind. Analysing the specific achievements of one country, allows greater understanding on how the MDGs are executed and monitored, which measures are working and what must be done to accomplish the goals before 2015. I found South Africa especially interesting, as I studied the 9th semester of medical school, related to paediatrics, obstetrics and gynaecology, at the University of Stellenbosch in South Africa in 2009. During my 20 weeks at Tygerberg University Hospital, various smaller hospitals and primary health care clinics, I got a greater insight in to how the South African health system works, and better knowledge of social determinants for health. I talked with doctors, nurses, medical students, patients and South Africans in general, to get a greater understanding on health in South Africa.

In this paper I will present the background for the MDGs and how they are monitored. I will then present historical roots to inequalities in the population of South Africa and in the health system. I will draw attention to current child mortality trends, and present different explanations to the causes of deaths. Further, I will include data from the South Africa Millennium Development Goals Country Reports. Finally, I will present suggestions to avoidable deaths, modifiable factors and the potential in existing care propose an answer the question of whether South Africa will reach the MDG on child survival.

Methods and sources of information

The literature in this paper draws on various sources including the Lancet Series on Health in South Africa[3,4,5], including the series on maternal and childhealth in South Africa[6,7,8,9], South Africa's Millennium Development Goals Country Reports[10,11,12], the United Nations Millennium Development Goals Report 2010[13], and relevant articles found through a non-systematic search in PubMed and Google scholar.

The Lancet with a group of researchers, physicians and public health specialists, in 2009 published a series of six papers, providing an assessment of South Africa's health situation, with regard to maternal and child health, HIV and TB, non-communicable diseases and the effect of violence and injury in the population called "Health in South Africa" providing relevant and important information to South Africa's path towards reaching the MDGs. On the issue of child health in South Africa, three national audit reports – Saving Mothers,[7] Saving Babies,[8] and Saving Children[9] – are the important sources of data for identification of not only causes of death in mothers and children, but also present coverage and quality of health care, generating a powerful source of data for action in South Africa.
Monitoring the MDGs takes place at global and national level. The UN Secretary-General each year reports on the implementation of the MDGs in the MDG Report. In this paper, the latest report from 2010,[13] with the addendum 1 to goal 4,[1] are used as sources of information. At the national level, countries signatory to the Millennium Declaration are urged to produce a MDG Report to help engage political leaders and civil society, triggering acceleration towards achieving the MDGs. The frequency of reporting is flexible, suggestively every 3-5 years, depending of sources of new data[14]. South Africa has produced three MDGs Country Reports, notably in 2005[10], 2007[11] and 2010[12].

Results

The Millennium Development Goals and the goal on child survival

In September 2000, at the Millennium Summit in New York, the United Nations Millennium Development Declaration was adopted by 189 nations, building on commitments from UN summits and conferences of the 1990s. Derived from it are the eight Millennium Development Goals (MDGs) which set specific targets for poverty reduction, addressing topics like hunger, education, gender equality, health and environmental sustainability.[15] The goals represent a partnership between developed and developing countries, aiming to eliminate poverty. Since their endorsement, the MDGs have risen to the top of the development agenda, and are the common focus of priorities for the development community. From the goals are derived 18 quantitative and time-bound targets. The targets should be reached before 2015, using 1990 as the point of reference. In order to monitor the progress towards the goals, 48 relevant indicators were selected in an intergovernmental process in response to global conferences held in the 1990s. The Secretary-General presented the goals, targets and indicators to the General Assembly in September 2001 in his report entitled "Road map towards the implementation of the United Nations Millennium Declaration"[16]. An Inter-Agency and Expert Group (IAEG) supports countries in the progress towards achieving the MDGs, preparing data and analysis, producing guidelines and helping to define priorities and strategies[17].

The Millennium Development Goals

1 Eradicate extreme poverty and hunger
2 Achieve universal primary education
3 Promote gender equality and empower women
4 Reduce child mortality
5 Improve maternal health
6 Combat HIV/AIDS, malaria and other diseases
7 Ensure environmental sustainability
8 Develop a global partnership for development

MDG 4 aims to reduce by two-thirds, between 1990 and 2015, the under-five mortality rate. There are three indicators for monitoring progress: Under-five mortality rate (U5MR), infant mortality rate (IMR) and proportion of 1 year-old children immunized against measles[15]. The rationale for first indicator, which relates directly to the target, measuring child-survival, is that it also reflects on the social, economic and environmental conditions in which children live, including their health care. The U5MR captures more than 90% of global mortality among children under the age of 18[16]. The second indicator on IMR represents an important component of under-five mortality, also reflecting on the conditions in which children live and their health care. The infant mortality rate is considered to be a more robust estimate than the U5MR if the information is drawn from vital statistics registration[16]. Both U5MR and IMR show large disparities across geographical areas, between rural and urban areas and across socioeconomic groups. The third indicator, related to the measles vaccine, provides a measure of the coverage and the quality of the child health-care system in the country. Immunization is an essential component for reducing U5MR, and in developing countries governments usually offer immunization against measles, diphteria, pertussis and tetanus free of charge as part of the basic health package. Measles is the leading cause of child mortality among these vaccine-preventable diseases of childhood. Vaccination coverage for measles needs to be above 90% to stop transmission of the virus[16].

Health and health system of South Africa

The history of South Africa is permeated with discrimination based on race and gender, and reflecting on this can provide a relevant background to the challenges facing South Africa today. The first permanent European settlement was established in 1652 in the Cape of Good Hope. Years of wars and resistance followed, but the indigenous people was driven off their land or forced to work in settler farms. From 1654, slaves and farm workers were imported from neighbouring parts of Africa and India and Indonesia. These people are the ancestors of what was to become the people classified as the coloured population and the Indian population in present day South Africa. When discovering diamonds in the north in 1867, the country transformed from an agricultural to an industrial economy. Mining became the cornerstone of the economy, and racial segregation with reservation of land mostly for white people, and segregation of urban areas, led to the creation of overcrowded slums in black areas where diseases flourished. From 1948, the state policy of apartheid consolidated a political system of social separation, economic marginalization and political exclusion:

> "The system was based on racial classification from birth of all South Africans in to European (white), Asian (Indian), coloured, or Bantu (black) and a rigid racial hierarchy, with white people at its apex. This classification determined where a person could live, work, and go to school, whom they could marry, whether they could vote, and the resources allocated to their education, health care, and pensions"[4]

Millions of people were forced to live in rural areas, but the men had to seek jobs in the urban areas. Consequently, 60-80% of the economically active adult men were away from home. Civil society increasingly mobilized against apartheid in the 20th century, and anti-apartheid organizations became widespread within the country.

Combined pressure from resistance within the country and from outside South Africa, resulted in the dismantling of apartheid in the early 1990s and the country's first democratic election in 1994. ANC, formed in 1912, came to power and is now in its fourth period[4].

South Africa is a young democracy in the world. With the first democratic election in 1994, SA witnessed the end of half a century of apartheid, preceded by colonialism for 300 years. The new government inherited a highly fragmented health service and faced massive challenges, many of which still persist. In terms of its economy, South Africa is classified as a middle-income country, however it has health outcomes worse than in many lower income countries, and half of the population lives in poverty. "One of the most important influences on the health of South Africans has been the impoverishment of the black population in the face of general white affluence (…) inseparably linked with the very high burden of poverty-related diseases"[4]. Unemployment rates ranges from 25% counting those actively seeking work to 37%, including all who are not employed. Income inequalities increased from 1995 to 2005. Today, the richest 10% of the population accounts for 51% of income, while the poorest 10% accounts for 0,2% of income[4,18].

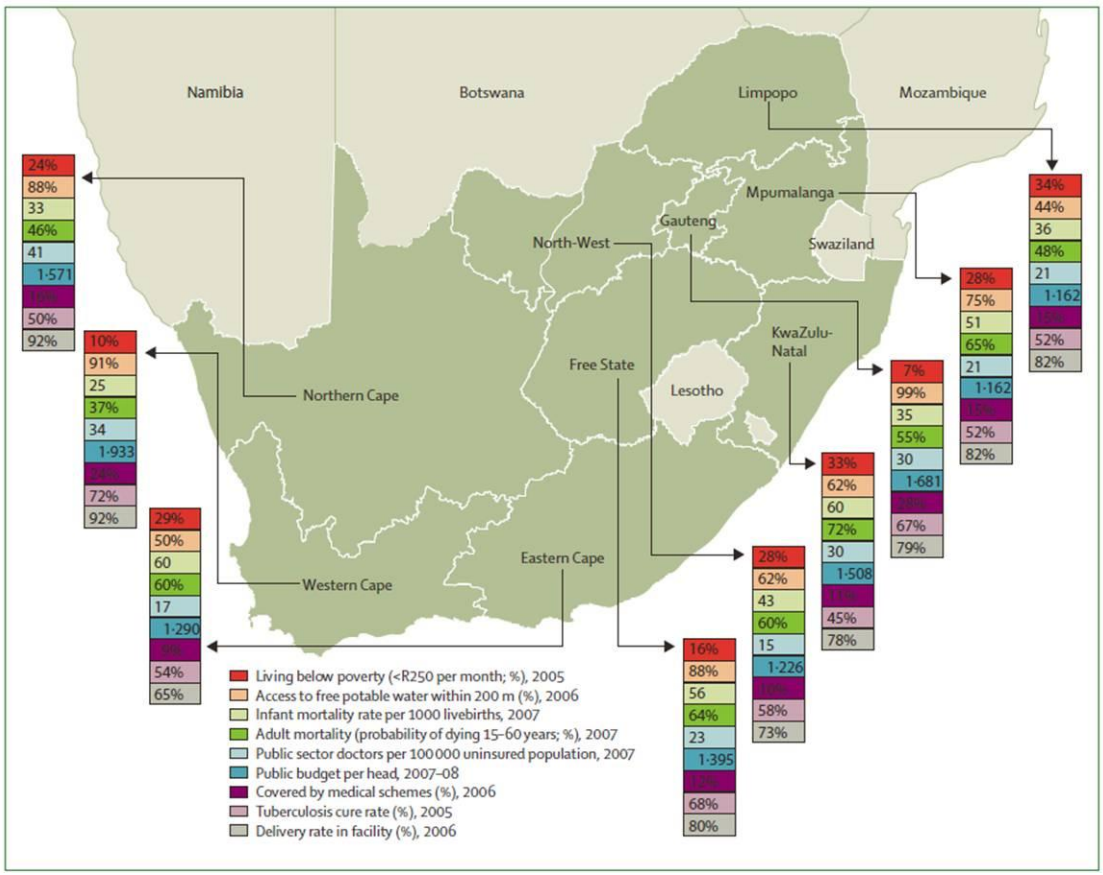

Figure 1: Indicators for health and development in South Africa's provinces, 2008. Source 4.

The post-1994 government efforts have focused on addressing and reversing inequities in health and wealth. In 1996, health care became available free to all children younger than 6 years and pregnant women in all government institutions[3,4]. Abortion was legalized the same year[3,4]. The government has made achievements in availability to basic services, increasing the number of households with access to

sanitation from 50% in 1994 to 73% in 2007[4].The number of beneficiaries of social grants increased from 2,4 million in 1996/97 to 12,4 million in 2007/08. This increase was largely due to the introduction of child support, now including children younger than 15 years[19]. Primary health care was made the cornerstone of health policy and became available without cost to users, and clinics were built and upgraded, improving access to health care services[4].

Modern South Africa is a multiracial society. About 84% of children are black African, 9% coloured, 6% white and 2% Indian. Less than half the population resides in rural areas, but two-thirds of South African children are located in these areas[6]. Between the races there are marked differences in morbidity and mortality, which reflect racial differences in access to basic household living conditions, health services and other determinants of health. In 2002, infant mortality rates varied between 7 per 1000 in the white population and 67 per 1000 in black population[6]. HIV prevalence estimates ranges between 0,6% and 1,7% in the white and Indian population, respectively, and 13,3% in the black population[6]. Substantial inequities are also evident between provinces. In 2000, mortality rates for children under 5 years ranged from 46 per 1000 live births in Western Cape province, to 116 per 1000 live births in KwaZulu-Natal province[6].

Panel: Structure of South African health sector

1 National Department of Health responsible for national health policy
2 Nine provincial departments of health responsible for developing provincial policy within the framework of national policy and public health service delivery
3 Three tiers of hospital: tertiary, regional, and district
4 The primary health-care system – a mainly nurse driven service in clinics – includes the district hospital and community health centres
5 Local government is responsible for preventive and promotive services
6 The private health system consists of general practitioners and private hospitals, with care in the private hospitals mostly funded through medical schemes

South Africa inherited a well-resourced health system in 1994, with total health care expenditure at 8,5% of GDP, levels equivalent to that of industrial countries. Yet, the public health sector is currently under-resourced and over-used. More than half of the human and financial resources were allocated to the private sector. In 2005, 15% of the population were members of a private sector medical scheme, yet 46% of all health-care expenditure was attributable to these schemes. Another 21% of the population used private sector on an out of pocket service, mainly for primary level care. The remaining 64% of the population are entirely dependent on the public sector for health care services. Public health-sector spending has been fairly stagnant since 1994, while expenditure in the private sector has increased[4]. The gap in spending per person in public health services, between the best and worst resourced provinces, declined in the same period[6] .

Child mortality and morbidity trends

Mortality rates for children under-five years in the developing world dropped by a third between 1990 and 2009, from 99 to 66 per 1000 live births[1]. The total number of children dying before the age of five declined from 12,4 to 8,1 million children annually in that period. Despite the acceleration of progress from year 2000, child deaths are not falling quickly enough to reach the target.

While there has been great advances in Northern Africa and Eastern Asia, among the 64 countries with high mortality rates, defined as 40 or more deaths per 1000 live

births, only 9 are on track to meet the target on child survival. The situation in sub-Saharan Africa is severe. Only one fifth of the global population of children under five live in sub-Saharan Africa, yet the region account for half of the annual 8,1 million deaths in this age group[13]. All 31 countries with U5MR of 100 per 1000 live births are situated in sub-Saharan Africa, with the exception of Afghanistan. High levels of fertility combined with still high percentage of mortality, have resulted in increase in absolute number of children who have died from 4 millions in 1990 to 4,4 millions in 2008[13].

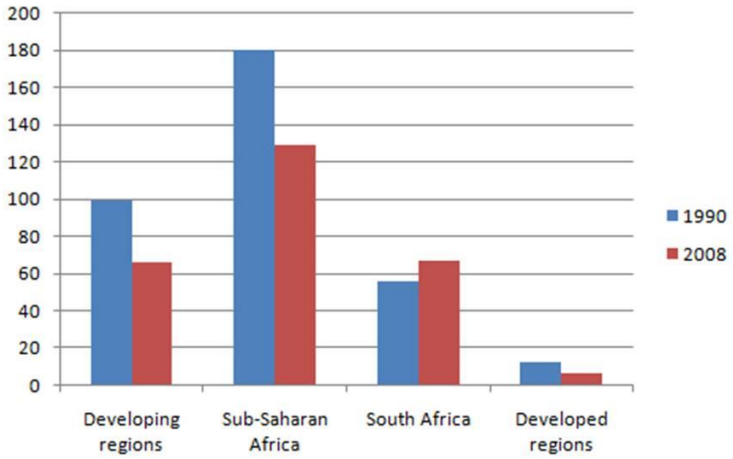

Figure 2: Mortality rates in different regions. Data from source 10 and 19.

Of the almost 50 million people living in South Africa, 18 million are children under 18 years, and 5 million are children under 5 years, resulting in South Africa having a population pyramid resembling that of other developing countries[18]. Despite the inequities of apartheid, there was a significant reduction in infant and child mortality rates in South Africa between 1960 and 1994, a trend also seen in other middle-income countries in the same period. This has been reversed since, and both IMR and U5MR have increased, largely due to HIV[18]. In South Africa, UNICEF estimates shows that the U5MR rose from 56 in 1990 to 67 in 2008. Infant mortality rates rose in the same period from 44 to 48 per 1000 live births[19]. In the dozen countries with increased child mortality rates since 1990, wars or major HIV crises are prevalent[6]. To meet the goal of less than 20 deaths per 1000 live births in 2015, South Africa must achieve an annual reduction in child mortality of 14%[6].

Debate surrounds national mortality figures and estimates, but all indications are that maternal and child mortality has increased since the baseline for the MDGs in 1990[6,18]. Although some increase can be artefact because of improved reporting of deaths, four out of five estimates for 2005 for mortality rates in children younger than 5 years were between 69 and 76 per 1000,[6] see figure 3. Despite uncertainty, South Africa is one of 12 countries in which the child mortality rate has increased instead of decreased since 1990[6]. Similar countries with equal mortality rates to South Africa in 1990 – such as Brazil, Mexico and Egypt – are on track to meet the MDG 4. These countries have halved their mortality rate for children younger than 5 years[6].

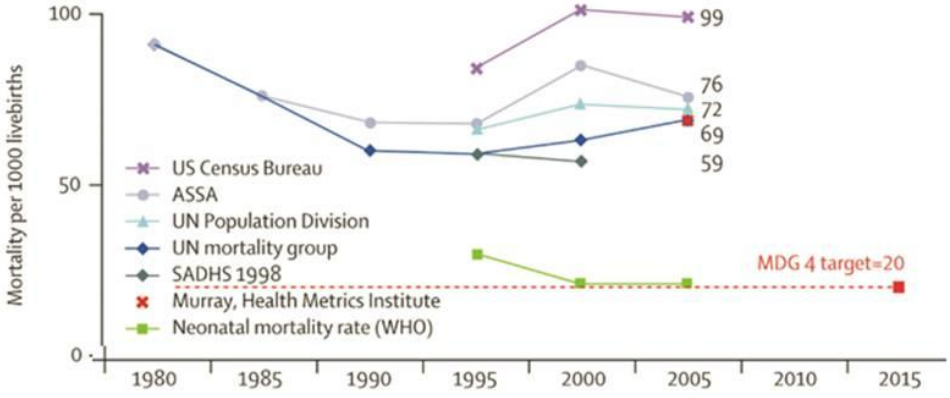

Figure 2: Rate of progress to child survival (MDG4) in South Africa. Source 6.
ASSA: Actuarial Society of South Africa. SADHS: South Africa Demographic and Health Survey.

South Africa has fairly high registration coverage for births compared to other African Countries, estimated at 78% on the basis of registered births with data from South African Statistics Council and UN-estimated births every year. However, death registration is lower than birth registration, estimated to less than 30% of all child deaths[6]. The South Africa Every Death Counts Writing Group has in the national facility-based mortality audits for maternal, perinatal and child deaths provided valuable data[7,8,9], with the purpose of identifying causes of deaths, avoidable causes of death, and coverage and quality of care to present modifiable factors to deaths. On the basis of these findings, the group has presented recommendations to strengthen health care in order to save thousands of lives each year.[3] The reports show how reliable data is necessary to identify births and causes of deaths, and how these data can be used in decision making to accelerate progress for the MDGs.

Maternal mortality is audited through the National Committee on Confidential Enquiries into Maternal Deaths (NCCEMD). Stillbirths and neonatal mortality are recorded through the Perinatal Problem Identification Programme (PPIP) and child mortality through the Child Healthcare Problem Identification Programme (ChildPIP). The audits record deaths and underlying causes and discuss modifiable factors, identify priorities for action to reduce deaths, make recommendations for action and assess whether recommendations have been undertaken. The report on saving maternal lives[7] covers births in facilities, at present an estimated 84% of all births. PPIP includes stillbirths and neonatal deaths before discharge, covering 20% of all births[8]. ChildPIP[9] includes infants and children (birth to 18 years) in paediatric wards, covering only 6% of child deaths[6]. It is important to bear in mind that the audits only record deaths in healthcare facilities, and therefore are not designed to obtain population-based, representative data unless all deaths occur in facilities and all facility deaths are captured[6]. The ChildPIP is still new and covering few sites. The audit process has found data on causes of death in neonates to be difficult to obtain and assess. PPIP captures mainly deaths before discharge from health facility, missing early neonatal deaths after discharge, and resulting in some late neonatal deaths being registered as child deaths under ChildPIP, or missed if death occurs at home. Furthermore, identification of cause of death to identify avoidable factors, is not consistent with classification in the International Classification of Disease (ICD) rules with identifying one cause of death. Therefore, data for cause of death in the reports are based on South Africa's national burden of disease study[6].

Worldwide, three diseases – pneumonia, diarrhoea and malaria – account for more than a third of all deaths in children under five, while more than 40% of the children die during their first month of life[13]. Most of these deaths are preventable[13]. Undernutrition is an underlying cause of at least a third of all under-five deaths. In Sub-Saharan Africa diarrhoea, malaria and pneumonia cause more than half of death in children before the age of five[1].

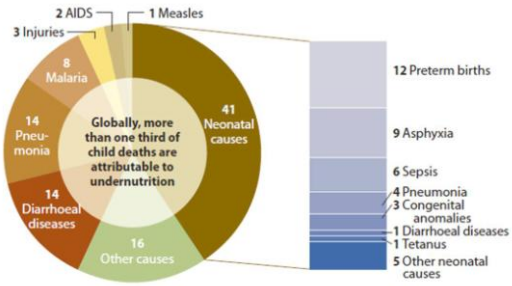

Figure 4: Causes of child death in the world. Source 13.

In South Africa, there are three major killers of children under the age of five – HIV/AIDS, neonatal causes and childhood infections such as pneumonia and diarrhoea. Neonates die mainly from infections, complications of preterm birth and asphyxia[6]. Figure 4 and figure 5 show that for the neonates, causes of death are more or less similar in the world and in South Africa. However, for children older than 28 days, HIV/AIDS is a major killer in South Africa, compared to the rest of the world.

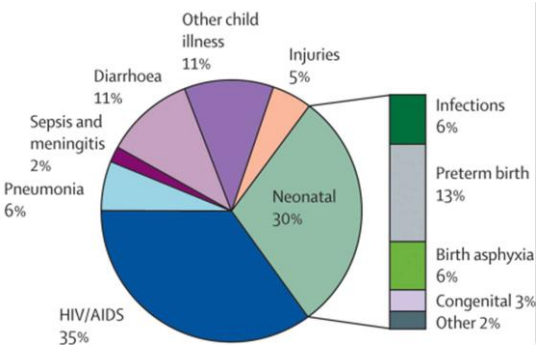

Figure 5: Causes of child death in South Africa. Source 6.

Coverage and quality of care

> "The challenge facing South Africa is to understand the paradox of a supportive policy and funding environment, high rates of use of maternal and child health services, and yet poor and in many cases worsening health outcomes"[3]

A closer look at the status of maternal and child health in South Africa will be needed to investigate this paradox.

Most of the increase in child and maternal mortality in South Africa can be accounted for by HIV/AIDS[6]. The country bears the greatest burden of mother-to-child-transmission of HIV of any country[3]. Nearly a third of all pregnant women are infected, resulting in roughly 300 000 women in need of health services for themselves and for prevention-of-mother-to-child-transmission (PMTCT). The rate of new infections is stabilizing, and more children are receiving needed treatment[6]. National guidelines dictate that all clinics should offer services for PMTCT, including HIV testing[21]. Investment in employment of thousands of HIV-counsellors has increased coverage of HIV-testing to almost 70% of pregnant women[3]. However, in only seven of 52 districts in South Africa are more than 80% of the pregnant women attending antenatal visits tested for HIV[6]. Furthermore, only 60% of the HIV-infected women and 45% of their babies received nevirapine, and only 26% of the newborns

are receiving co-trimoxazole profylaxis[3,6]. HIV/AIDS was in 2008 the leading cause of death in more than 80% of deaths after 28 days and before 5 years. The majority of children dying from pneumonia and sepsis, diarrhoea and malnutrition, were infected with HIV/AIDS[3]. Only an estimated 18% of children aged 0-14 years who need antiretroviral treatment are receiving it[6].

Primary health care facilities have high rates of use. Among pregnant women, 94% attend at least one antenatal visit, but only 73% attend up to four visits[6], and 84% give birth in a health facility. By the age of 1 year, 83% of children are fully immunized[3]. Immunization coverage has steadily increased. In the mid-90's, there were 19 000 reported cases of measles each year, but by 2008 this had decreased to only six[3]. Despite high coverage of institutional delivery and immunization, care for children is decreasing with time. This results in important missed opportunities for child survival interventions, such as a gap in postnatal care the first few days after birth where mortality rates are at the highest and when support for proper feeding choices can be made, related especially to PMTCT and HIV. Within the first hour of birth, 46% of women breastfeed, but the rate of exclusive breast-feeding until 6 months is the third lowest in Africa, at less than 10%[6]. Furthermore, as shown earlier, few HIV-exposed babies are receiving cost-effective interventions such as nevirapine and co-trimoxazole prophylaxis or being screened for HIV. In South Africa, due to scarcity in facilities, women are discharged after 6 hrs within normal labour. Clinic staff do not do home visits, and the clinic will not be informed that a women has given birth outside the facility. Present policy promotes health facility visit within 3 days, and again after 6 weeks, a policy most health care providers are not aware of[6]. Until recently, there was no national policy for timing or content of routine postnatal visits[6]. Currently, the option of home-visits in the postnatal period by health workers are being assessed as a measure to provide better care for women and their newborns[3].

> "The process to identify women and infants eligible for lifelong antiretroviral therapy and start treatment remain dysfunctional and represent huge missed opportunities to decrease maternal and infant deaths"[3]

Close to a third of all child deaths in South Africa occurs within the first month of life. The lack of progress in reduction in neonatal mortality is a major contributor to the high child mortality rates in South Africa. Improved intrapartum care would prevent most of the deaths of babies dying of birth asphyxia and reduce stillbirths[3]. Complications from preterm birth is the largest cause of deaths in neonates in South Africa. Health-care providers have used this data to change local programmes and improve care for newborns. The practice of Kangaroo Mother Care (KMC) is a low-cost resource-efficient method to give small babies extra warmth and care, and was only being practised in a few sites when Saving Babies started. There has been a systematic large-scale roll out of facilities providing KMC, and according to PPIP data, there has been a 30% decrease in neonatal mortality in hospitals that have introduced KMC[6].

Malnutrition increases the risk of death, especially from infections. Undernutrition is an underlying cause of at least a third of all under-five deaths in the world. Nutrition interventions can reduce not only prevalence of undernutrition but also death from diarrhoea and pneumonia[1]. Malnutrition is a major problem in South Africa where, in the children under five years, 12% are suffering from moderate or severe

undernutrition, 5% are wasted and 27 % are stunted[19]. In addition, there are high levels of micronutrient deficiencies, such as sub-clinical vitamin A deficiency, anaemia and iron deficiency[18]. The postnatal period is critical both for the newborn and the mother, especially the first 24 hours being the period with the highest mortality rates in both groups and two thirds of all neonatal deaths having occurred within the first week of life[20]. The postnatal period is also crucial for advising mothers on proper infant feeding choices as well as family planning.

South Africa has a continuum of health-services for mothers, babies and children. Despite fairly high coverage of most of the health-service packages, including antenatal care, skilled birth attendance and Integrated Management of Childhood Illness (IMCI), coverage in some important interventions and quality of care is low, showing important gaps. Figure 6 shows national coverage for key interventions for the health of mothers, babies and children over time, identifying gaps in coverage.

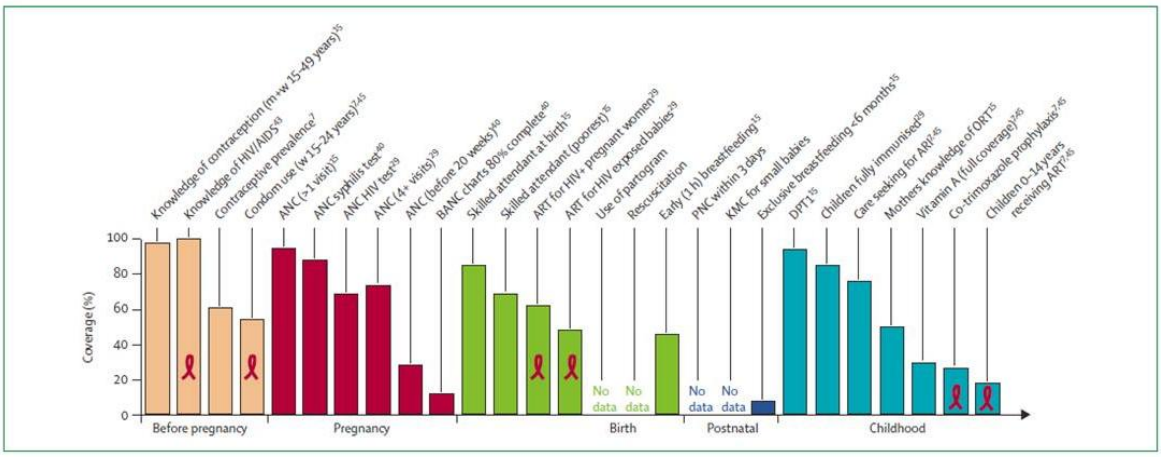

Figure 6: Coverage of maternal, newborn and child health by time. Figure shows coverage and quality gaps, and emphasises the gap around the time of childbirth and postnatal care and cascading HIV interventions. Red ribbon denotes HIV specific indicators. References in figure related to original article, not associated with the references of this paper. Source 6.

Average mortality hides major disparities, which exists both between urban and rural areas as well as between the public and the private health sector. Distribution and access to essential services are unequal across regions and districts, where that primary health-care spending is more than three times higher in the district with the highest spending than that in the district with the lowest spending. By the time the ANC came to power in 1994, infant mortality rates was ten times higher in the black population than in the white population[3].Today, poor children are four times more likely to die than richer children. The public health system serves 85% of the population, with only 40% of the total health expenditure[6]. Disparities in health services are affected by both uneven financial resource-allocation as well as by misdistribution of health personnel. There has been an overall decrease in nurse-to-population ratio, from 149 nurses per 100 000 population in 1998 to 110 nurses in 2007. Decline in numbers of nurses is due to closure of nursing colleges in the late 1990s, personnel lost to migration from public to private sectors and to jobs abroad, and due to retirements and HIV/AIDS. The percentage of doctors working in the private sector increased from 40% in the 1980s to 79% in 2007, and external migration remains high[4]. Approximately 60% of the country's paediatricians work in the private sector[18]. Despite positive policies, including increased uptake in medical

schools, compulsory community service for newly graduated doctors and nurses, few actions to address the human resources crisis has been put forward[4]. The post-apartheid government focused on addressing and reversing inequality making health services free for children and pregnant women. Primary health care (PHC) was made the cornerstone of health policy, resulting in a new clinic infrastructure where new PHC clinics were built and old ones upgraded. Availability and access to health-care services improved, and the gap in spending per person dependent on public sector health services declined five-fold from 1992/93 to 2005/06 between the best and worst resourced provinces[4]. However, the expansion of primary health-care facilities with the removal of user fees was to be delivered by a diminishing number of health workers resulting in health care personnel not being able to provide services of desired standard or in a comprehensive way. Reports and observations of rude and at times abusive behaviour of health workers, especially in the maternal setting are common[3].

Avoidable deaths and modifiable factors – the potential in existing care

The use of audit data on mortality put forward by the Every Death Counts writing group has made crucial findings on why mothers and babies die, and identified gaps in health service inputs and outcomes[6]. Through the reports modifiable causes of mortality has been identified at several levels from poor-quality clinical care to administrative shortcomings and avoidable factors within the community. The findings show that the health-care system alone is not to be held accountable, see table 1. The Saving Babies Report covering close to 40% of all deliveries in institutions classed 44% of neonatal deaths from intrapartum asphyxia as probably avoidable, due to poor monitoring or interpretation of fetal heart rate and management of second stage of labour. Avoidable deaths in children due to administrative problems was related to personnel not being available, not sufficiently trained or lack of paediatric beds. At the family level delays in identifying danger signs and seeking care was found to be attributable to about a quarter of deaths in children. However, when investigating the cause of delay in seeking health care further, in many cases the caregiver had earlier made a visit to the formal health sector. The findings lead to a call for better education of mothers and families, but also points to South Africas problem with health personnel being perceived as rude or giving suboptimum care, discouraging people from seeking care from the formal health sector.[3]

Better coverage and quality of existing health care can result in reductions in mortality.[3] The lives of almost 50 000 children could be saved in 2015 if South Africa reached high and effective coverage, especially through improved PMTCT and neonatal care.[3] This would put the country on track towards reaching MDG 4. Interventions of improved intrapartum care and improved care for the newborn counts for more than a quarter of potential lives saved, while almost three quarters of the potential lives saved could be attained through scale-up of PMTCT along with improved infant feeding choices. Analysis has showed that, although preventive childcare and management of childhood illnesses are important, the potential of lives saved through such improvements are of lower impact because coverage is already high[3]. For example, increasing coverage of immunization against measles, which is one of the MDG 4 targets, from current 83% to 95% (the target is >90%) would result in a only small increases in lives saved.[3] The analysis shows that care for children and reducing child mortality is closely interlinked with the health of the mother and MDG

5. Yet, data to track maternal mortality shows no measurable improvement and it has probably risen since the baseline in 1990[3]. Thus, reaching MDG 4 can result in substantial progress towards MDG 5, which is to improve maternal health[3].

	Family and community	**Administration and policy makers**	**Health-care providers**
Maternal death: Saving Mothers (NCCEMD)	44% of maternal deaths had a modifiable factor related to family/ community action – eg. inadequate or no antenatal care	32% of maternal deaths had a modifiable factor related to administrator action – eg. absence of blood for transfusion, and no transport between health institutions	54% of maternal deaths had a modifiable factor related to health-care provider action at the primary facility; 48% at secondary level; and 37% at tertiary level – eg. non-adherance to standard protocols
Stillbirths and newborn deaths: Saving babies (PPIP)	38% of stillbirths and early neonatal deaths had a modifiable factor related to family/community action – eg. delay in seeking care during labour	19% of stillbirths and early neonatal deaths had a modifiable factor related to administrator action – eg. personnel not available or not sufficiently trained	35% of stillbirths and early neonatal deaths had a modifiable factor related to health-care provider action – eg. fetal distress not identified in labour, poor response to maternal hypertension
Infants and child deaths: Saving Children (ChildPIP)	25% of all modifiable factors in child deaths were related to family/community action – eg. caregiver did not recognise severity of the illness	22% of all modifiable factors in child deaths were related to administrator action – eg. no senior doctors and nurses, and insufficient paediatric beds	53% of all modifiable factors in child deaths were related to health-care providers action – eg IMCI not used in clinics, and poor assessment and management in hospitals

Table 1: Modifiable factors underlying the deaths of mothers, babies, and children in South Africa, according to the three national mortality audits. Source 3.

The total cost of the target coverage and quality of existing health care for mothers, babies and children has been estimated to amount R15,7 billion or 24% of the public health-sector expenditure[3]. The incremental cost to cover the gap between present coverage and the target, would therefore be an extra R1,6 billion or 2,4% of total public-health sector expenditure[3].

The Millennium Development Goals Country Reports of South Africa

South Africa has produced three MDGs Country Reports in 2005, 2007 and 2010[10,11,12]. The reports reveal a remarkable shift in structure and content over time. The first two reports are relatively similar in content and lay-out, and provide scarce information on how the report was produced. The latest report of 2010 gives detailed information with regard to collaboration with stakeholders such as the United Nations Development Group and civil society organizations, use of data and structure of the report.

On child mortality, the first two reports, produced in 2005 and 2007, use more or less the same estimates for U5MR. The reports state that in 1998 U5MRs were 59/1000 live births, 60 in 2002 and 58 in 2003, concluding that "infant and under-five mortality rates have remained relatively constant since estimates made in 1998, with slight decreases of 0,5% and 0,3% for infant and under-five moratlity respectively"[10,11]. The report of 2007 further elaborates that "whilst this is still some distance away from the target of 20/1000 live births by 2015, it clearly shows that the

movement is in the right direction"[11]. The report from 2007 uses data from the South African Demographic and Health Survey 1993-1998 (SADHS) and SADHS 2003[11]. For U5MR in South Africa, these are of the lowest estimates available, see figure 3. Both the report of 2007 and 2010 notes that a limitation in the health sector has been the fact that South Africa had no reliable statistics until 1998 when the first SADHS was conducted, resulting in estimates from 1998, and not 1990, being used as point of reference. The report from 2010 shows U5MR at 97/1000 live births in 2001 and 104/1000 live births in 2007, based on estimates from the 2001 Census and the 2007 Community Survey, respectively[12]. In contrast to the reports from 2005 and 2007, the latest report uses estimates produced previous to the release of the first reports, which are substantially higher and states that "the current level of under-five mortality in South Africa is far higher than the international set target for South Africa (20/1000 live births)"[12].

The report from 2005 includes rates for neonatal-, infant- and under-five mortality per thousand live births at 20, 45 and 59 respectively, and also includes country specific targets for each indicator to be reached by 2015. However, the reports from 2005 and 2007 reveal some contradiction. They conclude in more or less the same manner that explicit objectives include reducing neonatal mortality from 20 to 14/1000 live births, retaining or ensuring that IMR does not exceed 45 (which is well above the 2015 target of 15/1000 live births) and reducing U5MR to 59 (which also is well above the target of 20/1000 live births)[10,11]. The report from 2010 includes infant-mortality rates of 54 in 2001 and 53 in 2007, concluding that "the infant mortality rate appears to have remained more or less the same despite the upward trend in the U5MR"[12]. Only the report from 2005 include estimates for neonates[10].

In relation to causes of death, all three reports lack an in-dept analysis with disaggregated data related to causes of death in the different age-groups, from neonates, infants and all children under five years. According to the 2005 report, among children aged under five years, "deaths due to intestinal infections, respiratory tuberculosis, influenza and pneumonia, and HIV/AIDS, accounted to less than 10% of deaths"[10]. No further notice is made on what children die of nor at what times during their first 5 years of life they are most vulnerable. The report from 2007, on the other hand, makes no mention of what children die of at all. The report from 2010 targets diarrhoea and pneumonia as significant contributors to child mortality, noting that the incidence of diarrhoea is declining in most provinces in the country[12]. Further, this report relates increase in child mortality primarily to the impact of HIV/AIDS and mentions PMTCT as a priority intervention in the public primary health facilities[12].

Immunization coverage is mentioned in all reports. In the report from 2005, the goal is to vaccinate 90% of children against measles and achieve a less than 10% drop out rate between the two doses. The proportion of one-year old children immunized against measles in 1998 was according to the first report 72%, estimated to increase to 82% in 2002[10]. However, the report from 2007 refers to the previous report, claiming that it reflected overall immunization coverage of 78%, based on 2002 estimates, further indicating that coverage had increased to 83% in 2006[10,11]. A positive feature of the report from 2007 is that it recognizes disparities with regard to coverage of immunization, and therefore has started implementing the WHO strategy known as Reach Every District (RED)[11]. In the report from 2010, immunization coverage for measles is estimated to have increased from 69% in 2001 to 98% in 2009, and the

report concludes that the target for immunization of children under 1 year of age is likely to be achieved by 2015[12].

The report from 2007 provides some information on health interventions to reduce child mortality, namely health workers trained in the Integrated Management of Childhood Illnesses (IMCI), including a community component to improve health-seeking behaviour, health services for school-going children and a food-fortification programme to improve health of children. The contributions made by provision of free health services, improved access water, sanitation and electricity are also included to have made progress towards improved child survival. While increased number of health workers being trained in IMCI and the community component with improving health-care seeking behaviour can be related to the modifiable factors for reducing child mortality[3], improved health services for school-going children is unlikely to contribute to reductions in child deaths for those younger than five years. Food fortification programmes is of relevance to child health, but in lesser extent for the age-group where the largest amount of children under five years die, namely the neonates and to a children under one year. The relevance of the health interventions mentioned in the report from 2007 can therefore be debated in light of the goal of reducing U5MR. The latest report marks a change in openness and commitment to the MDGs, compared to previous reports. This is especially evident in the fact that the report from 2010 includes a table addressing topics that needs to be focused upon in order to reverse the trend of increasing child mortality trends, see table 2. This report concludes that South Africa has the necessary policies in place to reduce child mortality, yet a trend of increasing rates in child mortality, acknowledging that greater efforts needs to be made to provide quality care[12].

Enhancing the dept and quality of child-related health data	The District Health Information System must be supported to continue collecting data in health care facilities conducting births, as well as in its endeavours to improve the quality of data collected
Improving the key socio-economic factors that impact on the health status of children	The key challenges in the achievement of the MDGs (including the under-five mortality) in South Africa are the improvement of the environment for children such as water, nutrition, sanitation and household food security
Strengthening and enhancing the quality and reach of primary health care for children	The key challenges in reducing under-five morbidity and mortality lie in combinating the main causes of deaths among children – diarrhoea, lower respiratory tract infections, peri-natal deaths associated with TB, HIV/AIDS, and malnutrition. South Africa will have to strengthen PHC as many children die at home even though they may have had some contact with the health care system
Expanding the reach of PMTCT, ARV treatment and nutrition programmes	Strengthening the health-care system to prevent mother-to-child transmission of HIV, as well as the provision of life-long nutrition and antiretroviral therapy which remain key to reducing associated deaths among children
Prioritising the implementation of the Integrated Management of Childhood Illnesses	The PHC system needs to be strengthened in order to ensure the effective implementation of the IMCI and other initiatives aimed at reducing child morbidity and mortality
Strengthening the capacity of health care providers to ensure effective implementation of national health interventions	The use of the Road to health Chart and improved patient care by primary health care providers (private practitioners) must be improved and aligned with national health priorities
Improving and expanding immunization coverage	The improvement and expansion of immunization coverage would serve to prevent many deaths amongst children under five years

Table 2: Measures necessary to reverse child mortality trends in South Africa, reproduced from the Millennium Development Goals Country Report of South Africa 2010. Source 12.

Conclusion

South Africa has made some progress towards several intersectoral goals, relevant for the millennium development goals and goal four, but progress has been insufficient and in some areas reversed. Although great achievements have been made on areas such as better living conditions and access to health care, high burdens of disease has placed a massive burden on an already under-developed and constrained health system, resulting in gaps in coverage and quality of care delivered. The paradox of poor health outcomes despite high expenditure and supportive policies insinuates that the South African Government needs to monitor implementation of policies and programmes and re-examine the distribution of resources.

The HIV/AIDS epidemic and neonatal deaths are two major causes of death in children under five in South Africa. Several gaps in child health care, especially in the early days, months and years of life, are of special concern, and in-dept analysis to causes of death has revealed missed opportunities to decrease child and especially infant deaths. South Africa has three important gaps in care, namely skilled attendance at birth, neonatal care and inequity. The close interconnection between child health and maternal health shows that lack in progress in MDG 5, related to maternal health, cannot be disregarded when investigating causes of increased child mortality rates in the last two decades in South Africa. Inequities in the South African society have resulted in a strained public health sector and large disparities in social determinants for health. This implies that the potential for improved health lies not only in the health care system, and that wider accountability and a multisectoral intervention is needed.

The vast majority of under-five deaths in South Africa could be avoided if coverage and quality of existing interventions was improved. Stronger leadership, greater local accountability will be crucial for improvements in coverage and quality, especially in PHC and hospitals. A strategy for re-energising and motivating health-workers will also be detrimental for improved health outcomes. Audit has proved useful for quality improvement, and to identify and target inequities, but its full potential can only be realised with expanded data collection and not least subsequent action.

Investigating the MDGs Country Reports reveals two interesting points: While child mortality has increased steadily since the baseline for the MDGs and South Africa is unlikely to achieve the fourth millennium development goal, the latest report of 2010 has proven to include highly relevant information for reducing child mortality, and the conclusions on necessary measures to be taken to reduce child mortality are closely linked up to literature and recommendations from research on the field. Now words must be put in to actions. They are affordable, attainable and sustainable. With commitment to priority actions, South Africa has the potential to achieve MDG 4.

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